

Biology 40S – Final Exam Review (2016-2017)

Key Terms by Topic:

Classification of Life:

Systematics

Taxon

Phylogeny

Bacteria,

Archaeobacteria, and

Viruses:

Prokaryote/prokaryotic

Microflora

Unicellular

Capsule

Gram-positive / Gram-negative

Cell wall / peptidoglycan

Nucleoid

Aerobic / facultative

anaerobic / obligate

anaerobe

Autotroph

Heterotroph

Chemoautotroph

Photosynthetic

Parasite

Saprobe

Transformation

Transduction

Conjugation

Core

Capsid

Protists

Multicellular

Eukaryote/eukaryotic

Protozoa

Zooflagelates, ciliates,
and amoeboids

Cilia

Pseudopod

Algae (brown, green, red)

Euglenoids

Slime molds / cellular
slime molds

Fungi

Hyphae

Mycelium

Chitin

Fragmentation

Spores

Budding

Yeast

Mycosis/mycoses (tineas,
candidiasis,
histoplasmosis)

Zygomycota, Ascomycota,
Basidiomycota

Plants

Mitosis

Meiosis

Haploid

Diploid

Spore

Gamete

Zygote

Sporophyte

Gametophyte

Xylem

Phloem

Angiosperm

Gymnosperm

Animals

Sac body plan

Tube-within-a-tube body
plan

Radial symmetry

Bilateral symmetry

Asymmetrical

Coelom

Acoelomate

Pseudocoelomate

Segmentation

Porifera

Cnidaria (medusa, polyp)

Platyhelminthes

Nematoda

Mollusca

Annelida

Arthropoda (uniramia,
crustacea, chelicerata)

Chordata

Understanding

Inheritance

Chromosome

Homologous pair

Allele

Dominant / Recessive
allele

Genotype

Phenotype

Homozygous

Heterozygous

Test cross

P, F₁, and F₂ generations

Purebred, hybrid, carrier

Polygenic inheritance

Codominance

Incomplete dominance

Autosome / Sex
chromosome

X-inactivation (Barr
body)

Crossing Over

Nondisjunction

Aneuploidy (monosomy,
trisomy)

Turner syndrome

Klinefelter syndrome

Down syndrome

Karyotype

Mechanisms of Inheritance

DNA	RNA (mRNA, tRNA, rRNA)	Mutagen
Nucleotide	Transcription	Transposon
DNA replication	Intron / Exon	Point mutation (silent, nonsense, missense mutations)
Gene	Translation	Frameshift mutation
	Codon / Anticodon	Cancer
	Gene mutation	

Review Questions and Competencies by Topic:

Classification of Life:

- Be familiar with the order of taxa (from domain to species).
- Be able to recognize and write a binomial name for an organism (*Genus species*; eg: *Homo sapiens*).
- Be familiar with the distinguishing features of the three domains of life (bacteria, archaea, and eukarya)

Bacteria, Archaeobacteria, and Viruses:

- How are microflora different from other bacteria? What good are they to us?
- How do prokaryotic cells (like those of bacteria and archaeobacteria) differ from eukaryotic cells (like those of plants, animals, and fungi)?
- What is the overall function of the bacterial cell wall? How does the cell wall of Gram-positive bacteria differ from that of Gram-negative bacteria?
- Be familiar with the basic shapes (cocci, bacilli, spirilli) and growth patterns (strepto, diplo, staphylo) of bacteria.
- Know the basic difference between aerobic, facultative anaerobic, and obligate anaerobic bacteria.
- Be able to define and distinguish between heterotrophic and autotrophic bacteria
 - Also be able to distinguish between photosynthetic bacteria and chemoautotrophic bacteria.
 - Know the difference between a parasite and a saprobe.
- Distinguish between bacterial asexual reproduction (binary fission) and bacterial sexual reproduction (transformation, transduction, conjugation). What makes these two processes different?
- What, basically, is different about the environments that archaeobacteria prefer to inhabit? Name a couple of environments archaeobacteria are often found in.
- What are the basic structural components of viruses?
- Why aren't viruses generally considered to be alive?

Protists:

- Generally, how are protists different from bacteria/archaeobacteria? Are there any similarities?
- What are the three major types of protists in Kingdom Protista?
- On what basis do we classify the 4 different types of protozoans? What are these 4 different types, anyway? List an example of each!
- In general terms, describe how the protist responsible for malaria is spread, as well as the general course of its life cycle.
- How are algae and euglena similar? How are they different?

- How are the fungus-like protists, in general, different from the plant-like protists and the protozoa?
- Why might it be harder to fight a protist infection with antibiotics than it would be to fight a bacterial infection with antibiotics? (Hint: which domain do our cells belong to? Which domain are protists in?)

Fungi

- Describe, generally, the composition of fungi. Are they multicellular or unicellular? Prokaryotic or eukaryotic? Are there any distinguishing cell features?
- What is the role of hyphae?
- How do fungi obtain and digest their food?
- Compare and distinguish between sexual and asexual reproduction in fungi. How do they sexually reproduce, and what are the various asexual methods they use?
- What are some of the commercially or industrially important uses for fungi?
- Mushrooms are delicious. Which phylum contains the majority of the delicious mushrooms we eat?
- Define the three types of human fungal infections, and be familiar with the symptoms of histoplasmosis and tinea.
- How are fungal diseases treated, and what complicates their treatment?

Plants

- What features distinguish plants from all of the previous organisms mentioned (bacteria, archaea, protists, and fungi)?
- Plants progress through two, alternating generations in their lives. Describe this alternation of generations and describe the two stages/generations.
- Into what three broad categories are plants arranged?
- What is the role of vascular tissue?
- What two types of vascular tissue do many plants contain? What is the role of each?
- How are angiosperms and gymnosperms different? How are they alike?

Animals

- What are the defining features of animals?
- What are some of the ways by which we can classify animals?
- What are the two body plans that animals may possess? Give two examples of animals that have each of these plans.
- What types of symmetry may animals possess? Give an example of an animal (or group of animals) that have each type of symmetry.
- What types of body cavities can animals have? Again, give an example of an animal or group of animals that has each type of body cavity.
- What are some examples of segmented animals that we have studied?
- What characteristics distinguish animals in Phylum Chordata from the other phyla studied?
- Which phylum first showed animals that had evidence of a nervous system?
- From which phyla did each of the animals we dissected come from (reminder: we dissected an earthworm, a crayfish, a squid, a frog, and a fetal pig)?

Understanding Inheritance

- Why do humans have two copies of every gene?
- What distinguishes a dominant gene from a recessive gene?

- Briefly describe Mendel's laws of Segregation and Independent Assortment.
- Distinguish between codominance and incomplete dominance.
- In humans, how does the inheritance of sex-linked traits compare to the inheritance of autosomal traits? Specifically, how does inheritance differ in men in this case?
- Distinguish between phenotype and genotype.
- Briefly describe how a test cross is carried out and how the results are interpreted.
- Be able to solve problems involve a single gene, two genes, codominance, incomplete dominance, blood types, and sex-linked genes.
- Explain how nondisjunction causes genetic disorders and diseases in offspring.
- Distinguish between monosomy and trisomy. Be able to identify these conditions (as well as gender) on a karyotype.

Mechanisms of Inheritance

- What are the structural units of DNA and RNA (ie: what are the repeating blocks that make up these molecules)? What are the three major components of these structural units?
- What are the nitrogenous bases used in DNA? In RNA?
- How are DNA and RNA structurally similar? How do they differ?
- Where is DNA stored in eukaryotic cells (such as our own cells)?
- Describe the process of DNA replication, including products of the process and enzymes involved.
- Describe the structure of a double-stranded DNA molecule. You may consider using the ladder analogy to structure your answer.
- Describe the process of transcription. Be sure to include the product, the enzymes involved, and the template used in this process. As well, include any processing done to the final product after transcription is complete.
- What is a codon? What does a codon code for?
- Describe the process of translation at the ribosomes, covering all three major steps (chain initiation, chain elongation, chain termination).
- What constitutes a gene mutation?
- What is a point mutation? Distinguish between the three types of point mutations that are possible.
- How does a frameshift mutation differ from a point mutation?
- How do mutations potentially cause cancerous growth (tumors) in our bodies?
- Be able to write DNA sequences that are complementary to a given strand.
- Be able to write mRNA sequences that are complementary to a DNA template strand.
- Be able to translate mRNA codons into a protein (sequence of amino acids) using a codon chart.